Trans-Lake Washington Project

Modal Assessment Results

March 2001

Washington State Department of Transportation

Sound Transit

Trans-Lake Washington Project

Modal Assessment Objectives

- Understand basic performance, impacts, and costs of individual alternatives
  - For the highway alternatives
    - compare between alternatives
    - refine (if necessary) connections and termini
  - For HCT alternatives
    - compare between alternatives
    - refine alignments for further consideration
    - * *Remember our objective with HCT is to determine if Sound Transit's Long Range Vision should be amended*
  - For transportation demand management
    - continue development of a core strategy

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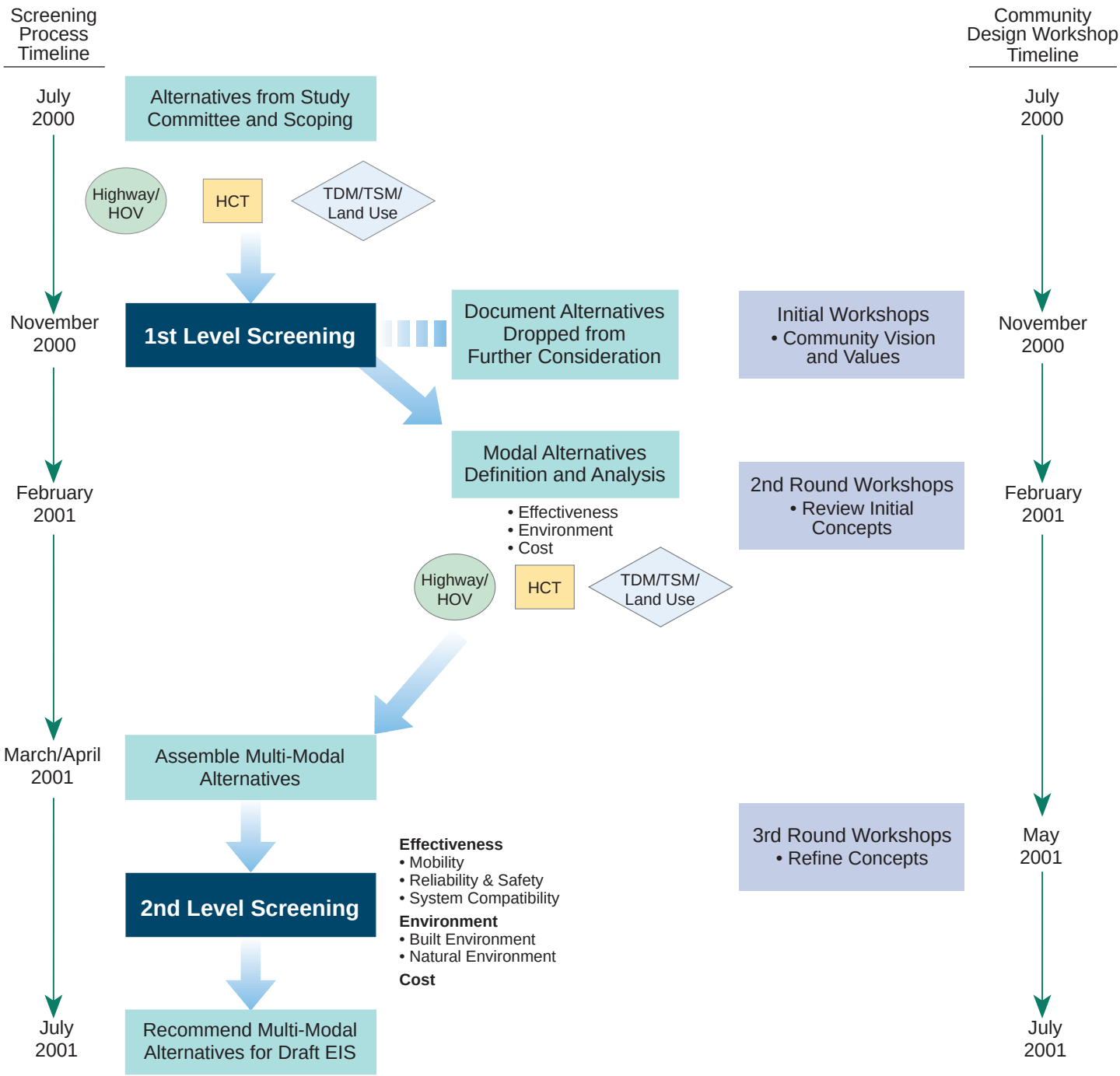
Screening Process



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HCT Alternatives
Results

- What did we learn about high capacity transit?

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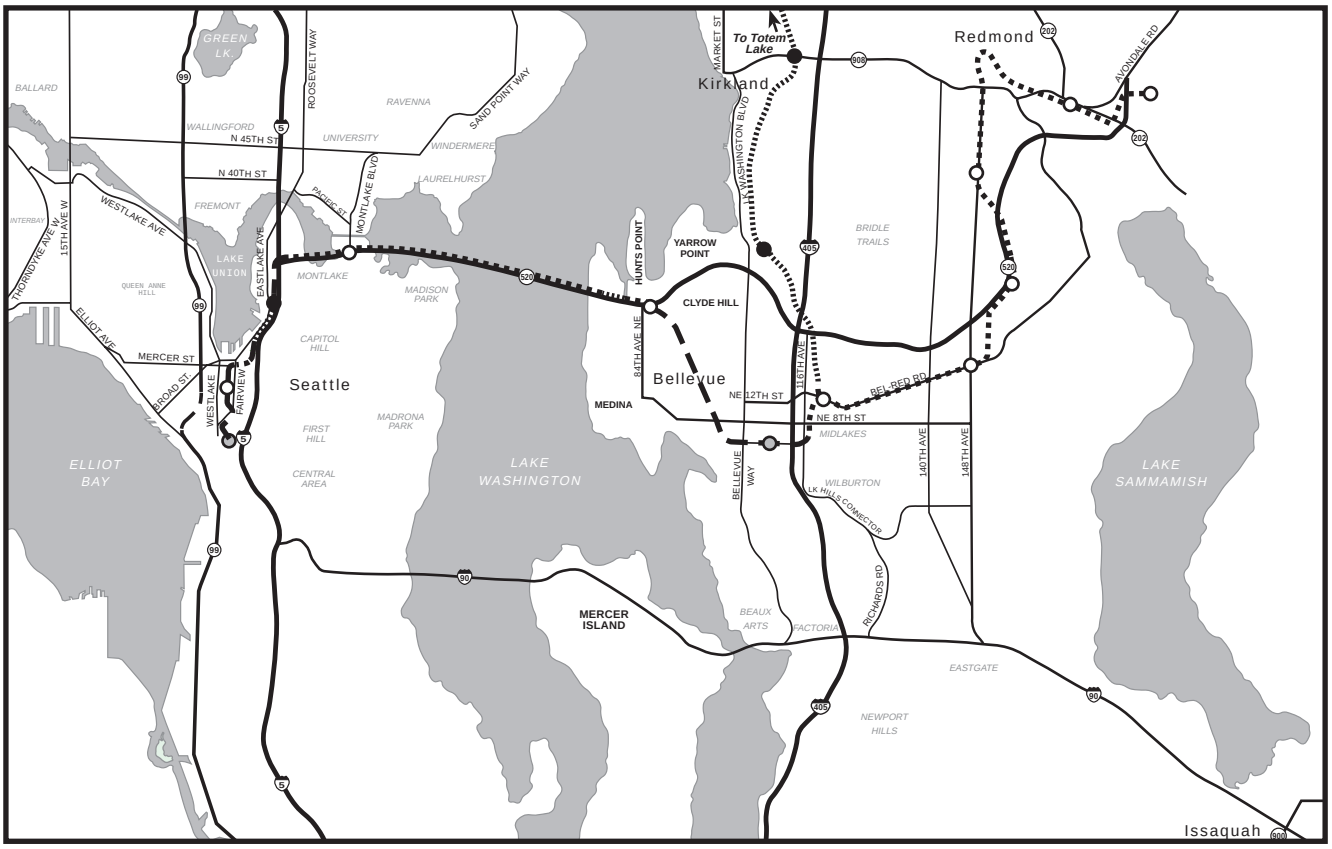
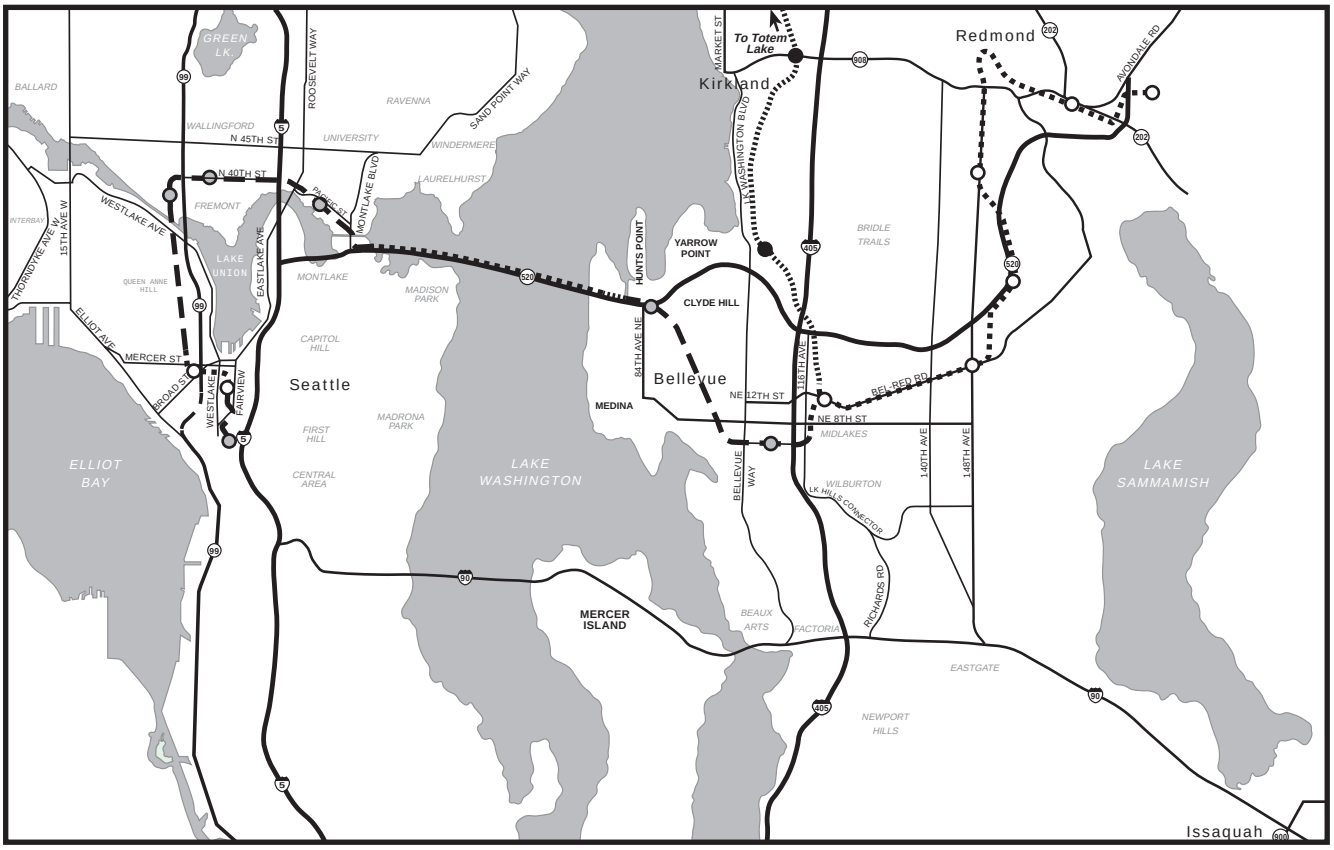
HCT Alternatives
Transit Ridership Summary

Transit	Crossing Lake Washington (daily)
No Action	40,000
C1: Fixed-guideway HCT in SR 520	51,000 – 55,000
C1: Busway HCT in SR 520	53,000 – 55,000
C2: Fixed guideway on I-90	46,000 – 52,000
C3: Fixed guideway HCT on Mid-lake	49,000



Alternative C1.1a: SR 520 Fixed Guideway
Downtown Seattle-Bellevue-Kirkland/Redmond



Alternative C1.1b: SR 520 Fixed Guideway
Downtown Seattle-U District-Bellevue-Kirkland/Redmond

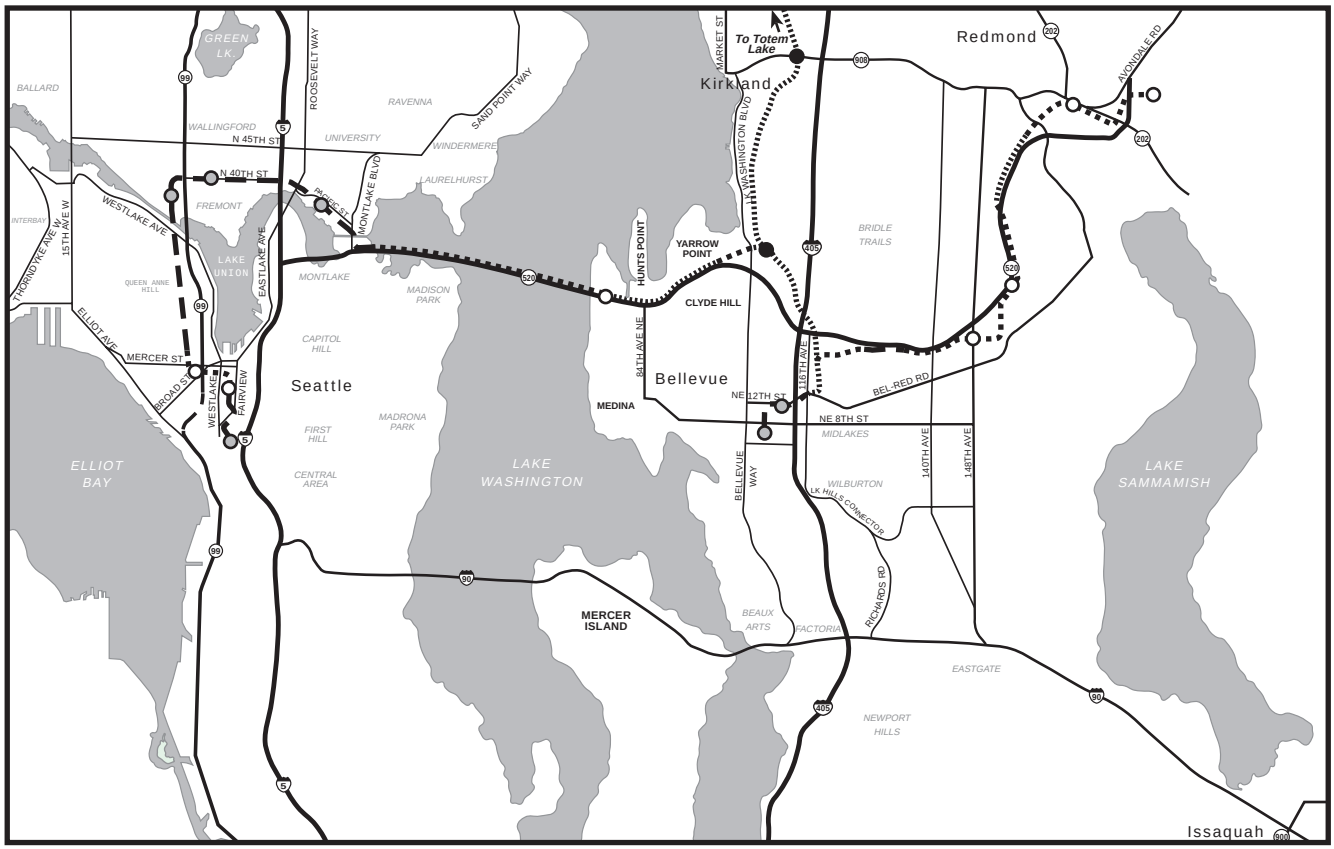
N

Alignment
- Aerial
- Subway
- At Grade

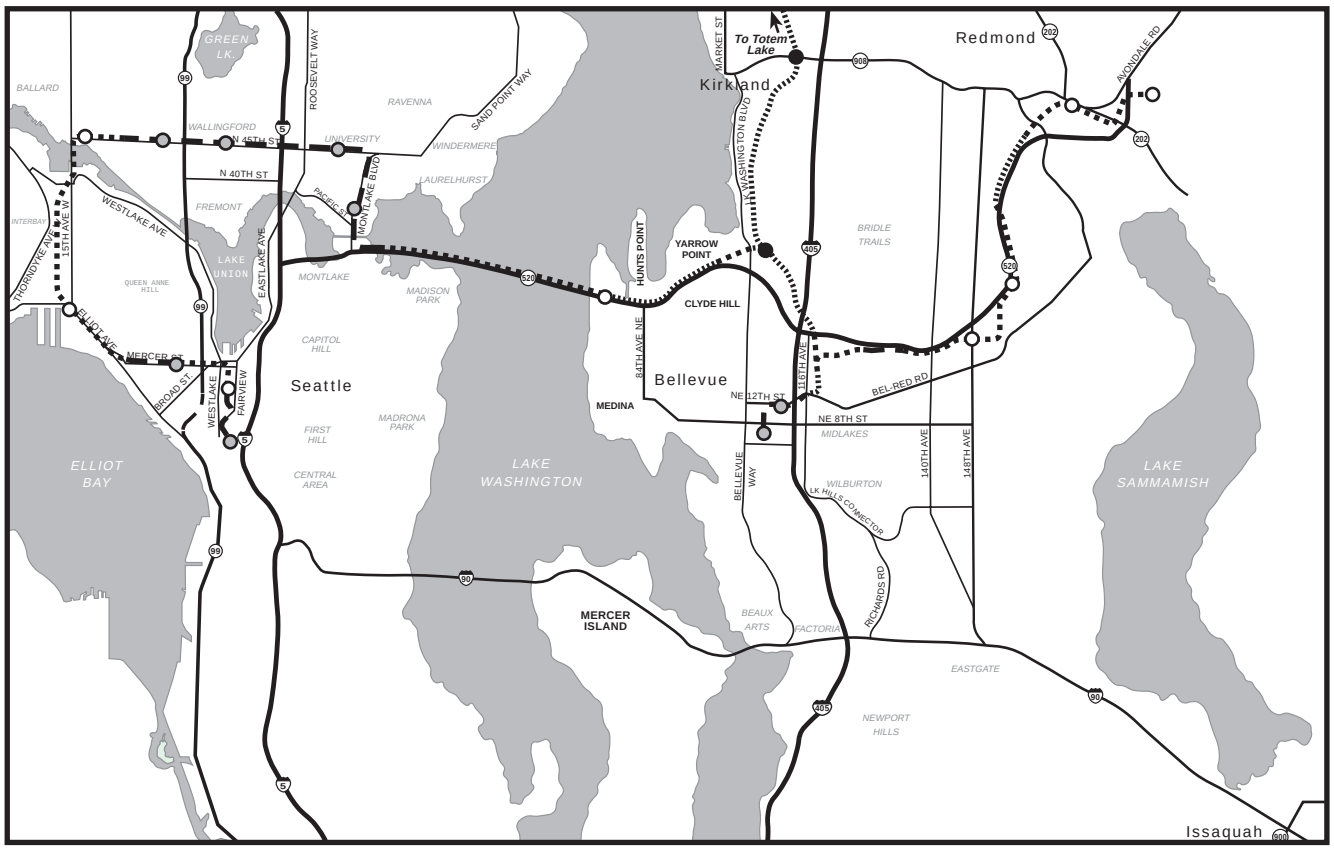
Station

Note: Short transition sections not shown

Figure 1-2



Alternative C1.1c: SR 520 Fixed Guideway
Downtown Seattle-U District-Kirkland/Redmond/Bellevue



Alternative C1.1d: SR 520 Fixed Guideway
Downtown Seattle-U District-
Kirkland/Redmond/Bellevue

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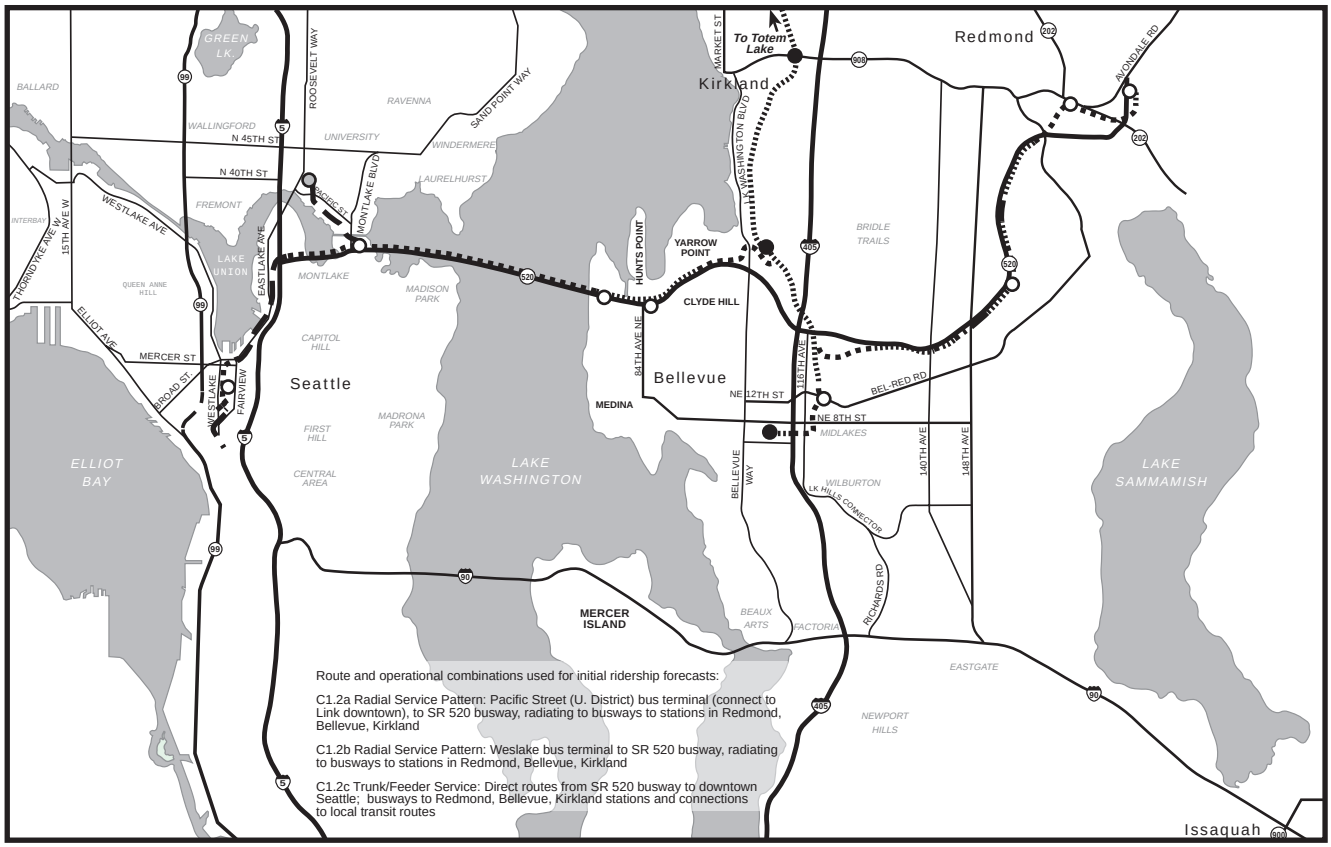
N

Alignment
- Aerial
- Subway
- At Grade

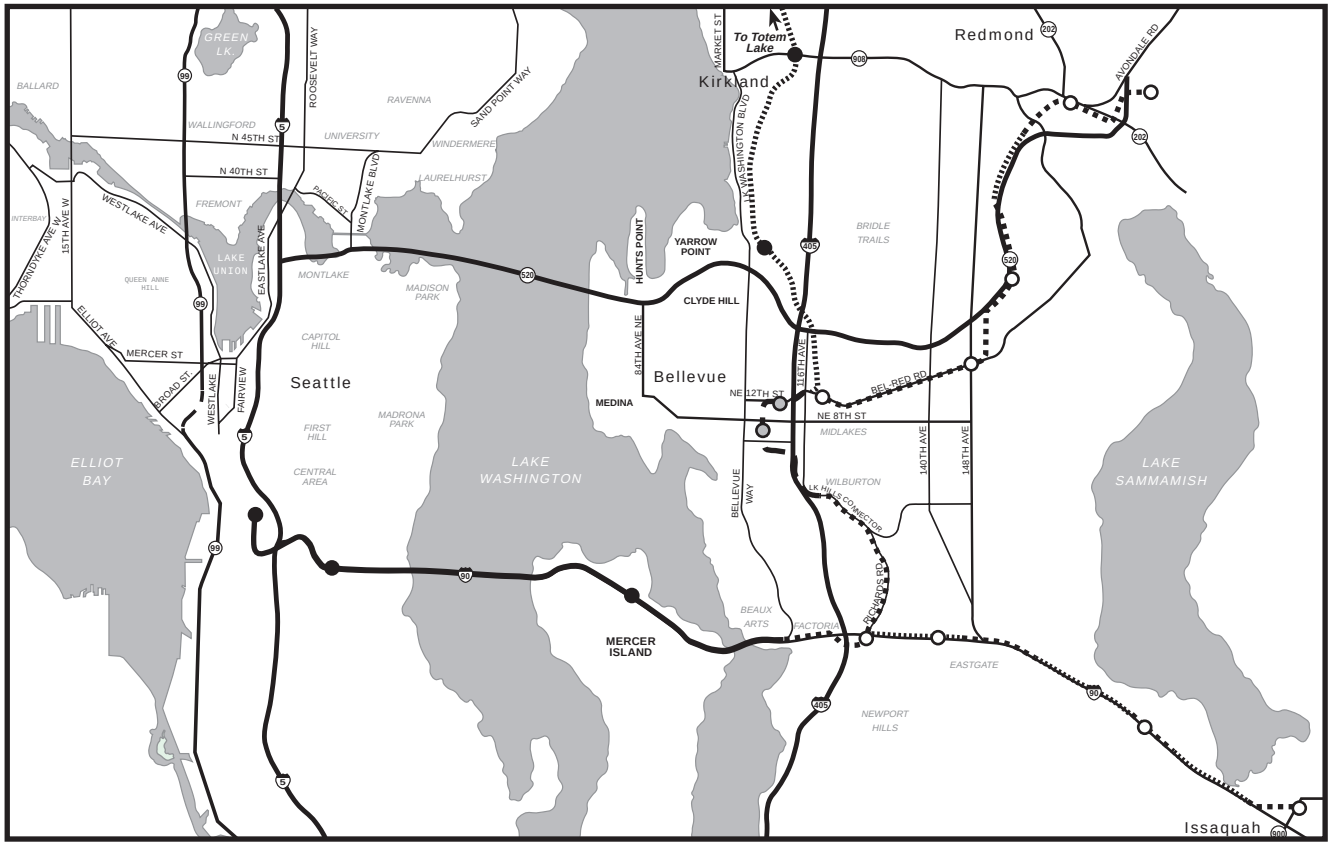
Station

Note: Short transition sections not shown

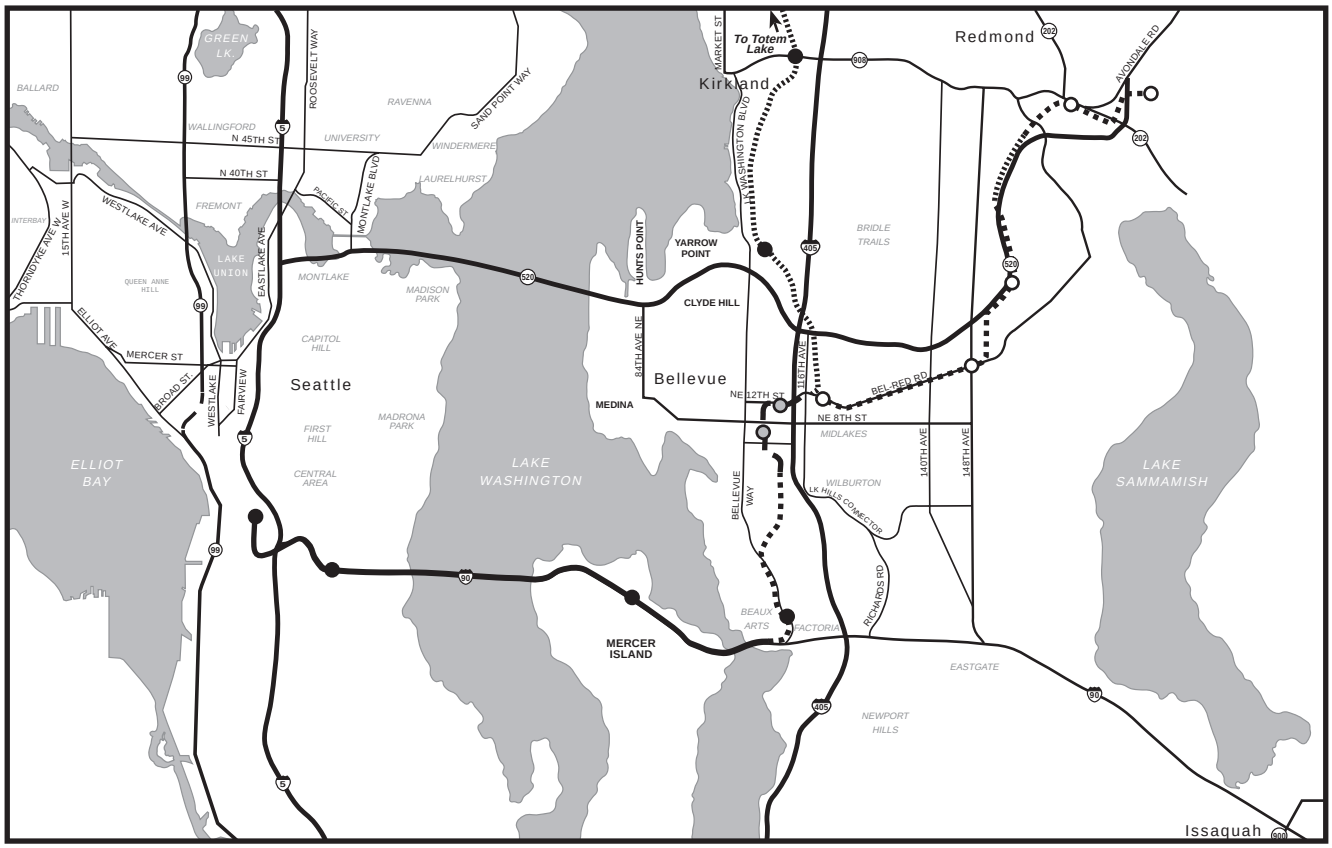
Figure 1-3



Alternatives C1.2a, C1.2b and C1.2c:
SR 520 Bus Rapid Transit Route Options



Alternative C2.1a: I-90 Fixed Guideway
Downtown Seattle-Factoria-Issaquah/Bellevue-Kirkland/Redmond



Alternative C2.1b: I-90 Fixed Guideway
Downtown Seattle-Bellevue-Kirkland/Redmond

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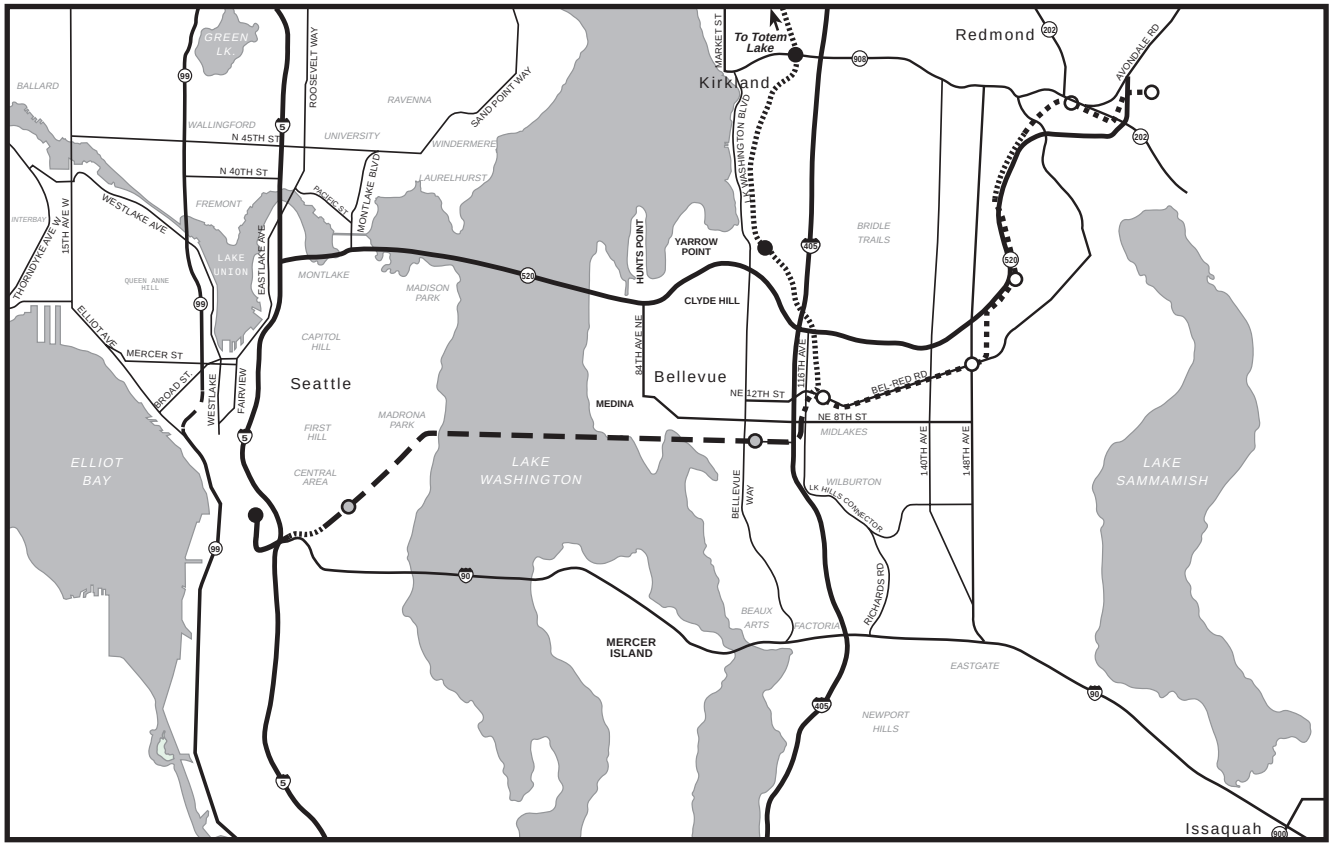
N

Alignment		Station
Aerial		○
Subway		◎
At Grade		●

Note: Short transition sections not shown

Figure 1-5



Alternative C3.1a: Midlake Fixed Guideway
Downtown Seattle-Bellevue-Kirkland/Redmond

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N

Alignment	Station
Aerial	○
Subway	◎
At Grade	●

Note: Short transition sections not shown

Figure 1-6

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HCT Alternatives

PM Peak Period Transit Ridership Crossing Lake Washington

	EB (historical 'peak' commute)	WB ('reverse' commute)
No action	9,100	6,300
C1: Fixed guideway HCT in SR 520	9,600 – 10,700	8,000 – 9,600
C1: Busway HCT in SR 520	11,200 – 11,400	9,300 – 10,300
C2: HCT on I-90	9,300 – 11,000	7,500 – 8,500
C3: HCT Mid-lake	11,300	9,500

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HCT Alternatives

Impacts

- I-90 crossing has least impacts
- SR 520 crossing has unavoidable parks & wetlands/habitat impacts at Montlake/Foster Island
- Mid-lake crossing would have construction impacts at portals
- All alternatives cross Sammamish River & Bear Creek

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HCT Alternatives
Capital Costs (2001)

Alternative	System	Lake Crossing Only	Total Cost
SR 520	Fixed Guideway	$190 M	$3.8 - 5.2 B
SR 520	Bus rapid transit	$340 M	$3.7- 4.8 B
I-90	Fixed Guideway	$90 M	$2.6 - 3.3 B
Mid-lake	Fixed Guideway	$1-1.3 B	$3.9 - 4.2 B

Costs do not include mitigation

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HCT Alternatives
SR 520 Fixed Guideway Findings

- Westside networks serving U-District generate significant intra-Seattle ridership
- Eastside network focused on Bellevue CBD best serves both intra-Eastside and Crosslake markets
- Lake crossing costs relatively small portion of required investment
- High cost of Clyde Hill tunnel not justified by ridership gains

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HCT Alternatives
SR-520 BRT Findings

- Both service concepts result in similar ridership
- Capital costs and ridership for BRT similar to Fixed Guideway
- All options result in Westside bus volumes requiring large capital investment or high utilization of surface street capacity

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HCT Alternatives
I-90 Fixed Guideway Findings

- Requires significantly lower Westside investment
- Lake crossing costs relatively small portion of required investment
- Higher ridership achieved with direct Bellevue CBD routing
- Rail extension to Eastgate & Issaquah generates little new ridership compared to feeder bus and transfer at South Bellevue

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HCT Alternatives

Mid Lake Fixed Guideway Findings

- Lake crossing is high portion of capital cost
- Ridership similar to I-90 and SR-520
- High engineering and construction risk associated with deep underwater bored or untried floating submerged tunnel

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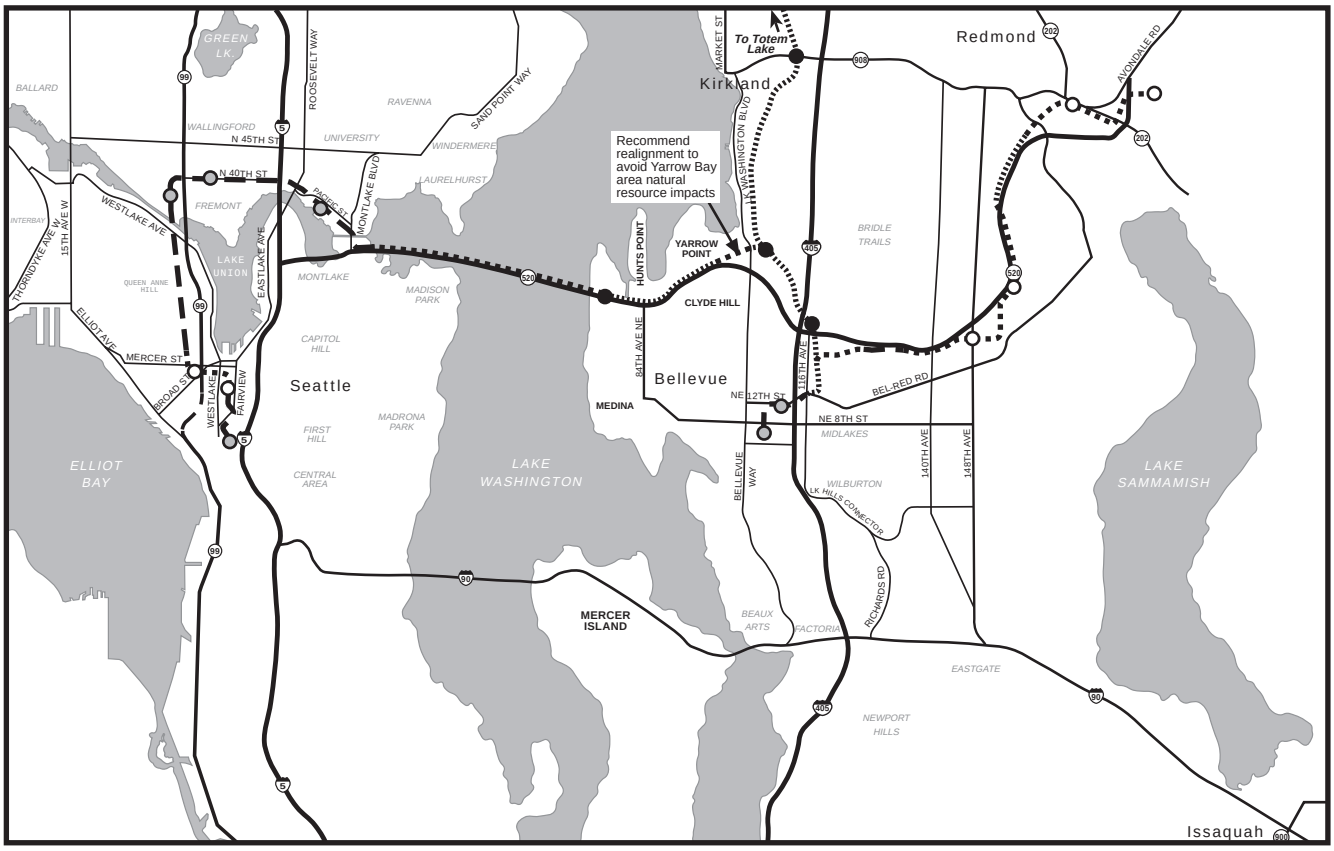
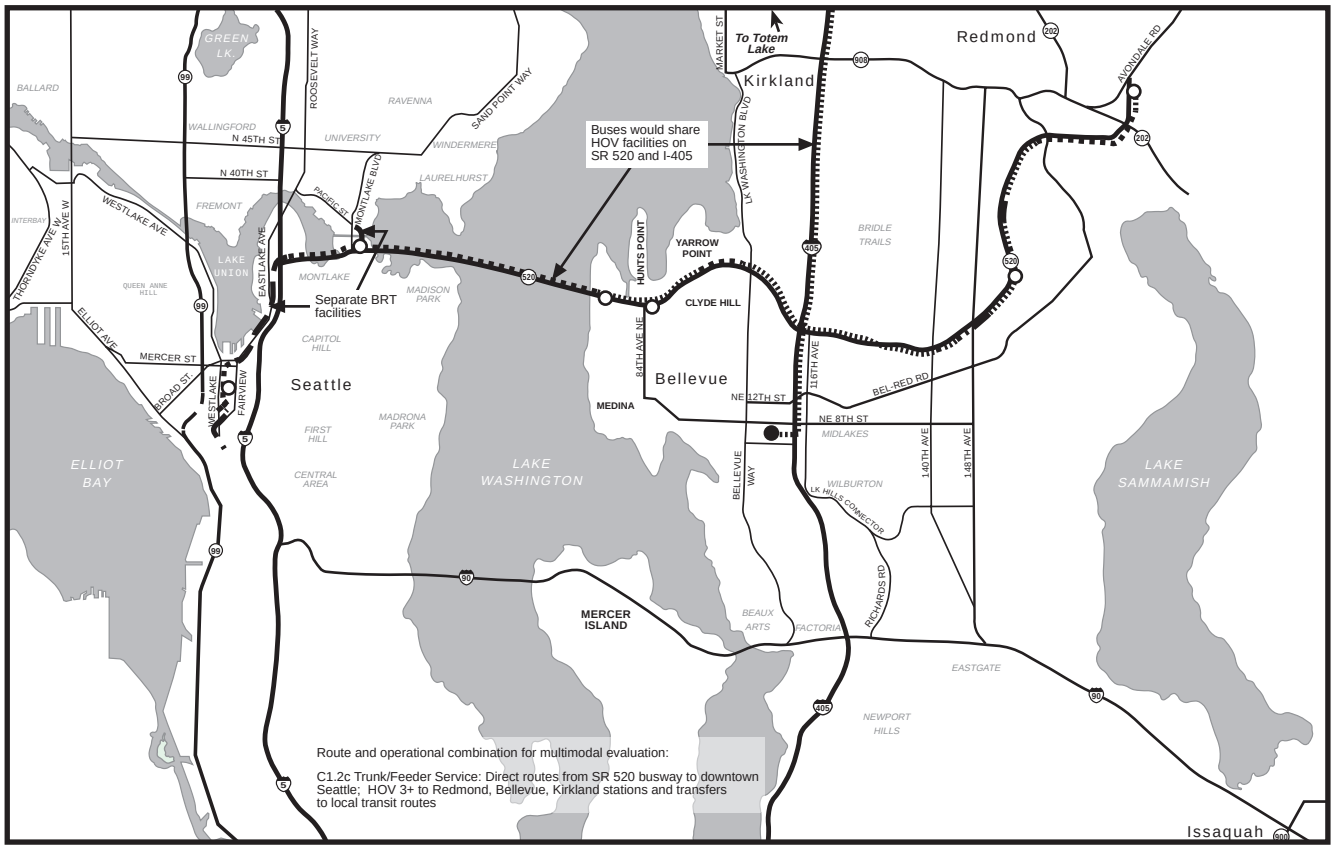
HCT Alternatives

Conclusions

- I-90 has lowest cost and least environmental impacts with similar performance and should be advanced
- SR-520 alternatives avoid potential I-90 traffic impacts, have potentially higher intra-Seattle ridership and should be advanced.
- BRT alternatives have costs and ridership similar to Fixed Guideway and should be revised to use combined HOV/transit facilities where possible to reduce costs
- Mid Lake alternatives benefits do not offset high risks and costs and should be dropped



Proposed SR 520 Fixed Guideway Route
Downtown Seattle-U District-Kirkland/Redmond/Bellevue*
***(For multimodal evaluation purpose, other routes could be used for future system planning.)**



Proposed SR 520 Corridor
Bus Rapid Transit

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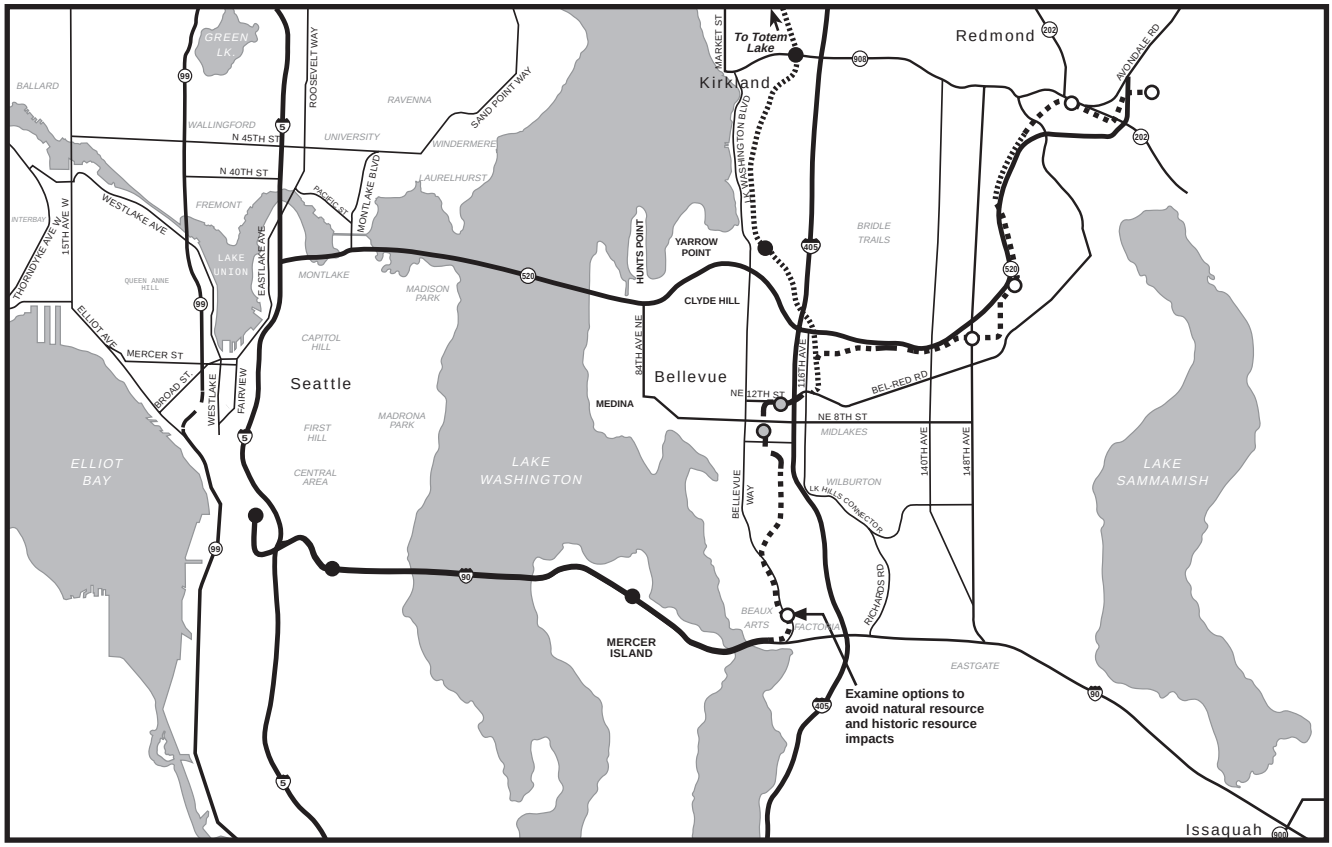
Alignment: Aerial, Subway, At Grade

Station

N

Note: Short transition sections not shown

Figure 1-8



Proposed I-90 Fixed Guideway Route
Downtown Seattle-Bellevue-Kirkland/Redmond*
***(For multimodal evaluation purpose, other routes could be used for future system planning.)**

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N

Alignment	Station
Aerial	○
Subway	◎
At Grade	●

Note: Short transition sections not shown

Figure 1-9

Trans-Lake Washington Project

Highway Alternatives

- Alternatives Review
  - B-1 Minimum Footprint
  - B-2 1 HOV lane each direction
    - I-5 express lanes to SR 202
  - B-3 1 HOV lane and 1 GP lane each direction
    - same HOV lane configuration
    - GP from SR 202 to Eastlake (Fairview area)
  - B-5 Bus only lanes
    - same configuration as HOV lanes

Trans-Lake Washington Project

Highway Alternatives *Performance*

Daily Trans-Lake Vehicle and Person Trip Volumes and Modal Split
Screenline A: SR 520 Only

Roadway Facility	Daily Vehicle Volumes				Daily Person Trip Volumes		
	Non-HOV	HOV (3+)	Commercial	Total	Non-HOV	HOV (3+)/Bus	Total
No Action	86,800	4,800	29,600	121,100	115,500 75.0%	38,400 25.0%	153,900 100.0%
Minimum Footprint	86,900	4,800	29,600	1211,200	115,500 75.0%	38,400 25.0%	153,900 100.0%
HOV Lanes (B2) Connection to I-5 Express	89,400	11,500	30,000	130,900	119,000 57.6%	87,600 42.4%	206,600 100.0%
GP & HOV Lanes (B3) Added GP ends at Fairview/Eastlake and HOV connects to I-5 express	131,200	12,700	41,200	185,100	174,500 64.5%	96,200 35.5%	270,700 100.0%
Bus and Vanpool Only Lanes (B5)	87,300	3,900	29,400	120,600	116,200 69.4%	51,200 30.5%	167,400 100.0%

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Highway Alternatives
Impacts

- Eight lanes has largest footprint - most impacts
- Minimum footprint has least impact
- Interchange option of cut and cover tunnel under Union Bay from Foster Island needs discussion with resource agencies

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Highway Alternatives
Costs

Conceptual Capital Cost Estimates (Millions of 2001 Dollars) Costs do not include mitigation

Alternative	Mainline with Interchanges	Local Streets	Total
B-1. Minimum Footprint	$1,060	$10	$1,280
B-2. HOV Lanes (I-5 Express lanes terminus)	$2,440	$120	$3,050
B-3. HOV and GP Lanes (HOV terminus at I-5 Express lanes and GP terminus at Eastlake/Fairview	$5,200	$550	$6,070
B-5. Bus-only lanes (same configuration as HOV lanes)	$2,440	$120	$3,050